Salmon Program

State Recovery Projects
Application Project Summary

TITLE:	Knotweed Control - Mission & Tahuya Year 1 - 137	**NUMBER:** 09-1641R (Restoration) **STATUS:** Preapplication	
APPLICANT:	Hood Canal SEG	**CONTACT:**	

COSTS:

RCO	$189,710	80 %
Local	$47,427	20 %
Total	$237,137	100 %

SPONSOR MATCH:

Grant - State	$47,427

DESCRIPTION:

Need: Compared to native plant species, knotweed shows a **decreased ability to control erosion** despite having an extensive root system. During flood events, plant fragments are washed downstream where rhizome and stem pieces create new infestations. **Increased sediment is a factor in the loss of productive salmonid habitat**. Sediment can fill in the spaces between riverbed spawning gravels and fill in pools used for rearing. It negatively affects salmonids by smothering viable eggs, decreasing their feeding success, and damaging gill filaments. Knotweed negatively affects aquatic invertebrates that compose the basis of the aquatic food chain by an alteration of the quality and timing of the leaf litter regime. This alteration changes nutrient inputs and soil composition. Invertebrates are the primary food source of juvenile fish species.

Goals: The goal of this project is to identify all infestations and treat on a worksite by worksite (subbasin) determined by funding availability.

Scope: Limiting factors of salmonid production include elevated stream temperature, increased silt loads, poor riparian conditions, poor floodplain conditions, and a lack of large woody debris.

Outcomes: Location, Control, Monitoring of Knotweed infestation, and restoration of riparian corridors.

Community: Huge positive potential witnessed by the demand for education and number of volunteers.

Phases: Little previous work in the proposed worksites. Best science demands a **three year control cycle.**

LOCATION INFORMATION:

LEAD ENTITY ORG: Hood Canal Coor Council LE

COUNTY:

GOAL & OBJECTIVE:

The goal of the project is to restore native riparian vegetation along salmon bearing streams.

The objective of the project is to restore natural streamside vegetation, improve stream temperature, reduce erosion, filtration, and recruit large woody debris.

PERMITS ANTICIPATED:

None - No permits Required

SALMON INFORMATION: (* indicates primary)

Species Targeted

Chinook
Chum*
Coho
Rainbow
Searun Cutthroat
Steelhead

Habitat Factors Addressed

Biological Processes
Channel Conditions
Loss of Access to Spawning and Rearing Habitat
Riparian Conditions*
Streambed Sediment Conditions
Water Quality
Water Quantity

LAST UPDATED:	June 20, 2009	**DATE PRINTED:**	June 25, 2009

Restoration Cost Estimate Summary

Hood Canal SEG **09-1641 R**

Knotweed Control - Mission & Tahuya Year 1 - 137 **Salmon State Projects**

Element/Item	Unit	Quantity	Unit Cost	Total Cost	Description Needed	Description
Worksite #1, West WRIA 15 Big Mission Creek						
Riparian Habitat						
Plant removal/control	Acres	193.90	$300.06	$58,182.00	Optional	Labor
Plant removal/control	Acres	193.90	$30.01	$5,818.00	Optional	Chemicals & Supplies
Worksite Tax Amount				$483.00		
Worksite A&E Amount				$9,672.00		
Worksite Total Costs				**$74,155.00**		
Worksite #2, West WRIA 15 Tahuya River						
Riparian Habitat						
Plant removal/control	Acres	426.70	$299.98	$128,000.00	Optional	Labor
Plant removal/control	Acres	426.70	$30.00	$12,800.00	Optional	Chemicals & Supplies
Worksite Tax Amount				$1,062.00		
Worksite A&E Amount				$21,120.00		
Worksite Total Costs				**$162,982.00**		
Project Tax Amount				$1,545.00		
Project A&E Amount				$30,792.00		
Project Total Costs				**$237,137.00**		

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PROJECT PROPOSAL – RESTORATION, ACQUISITION, AND COMBINATION RESTORATION/ACQUISITION PROJECTS-2009

INSTRUCTIONS: Salmon Recovery Funding Board applicants must respond to the following items. Please respond to each question individually -- do not summarize your answers collectively in essay format). Local citizen and technical advisory groups will use this information to evaluate your project. Contact your lead entity for additional information that may be required. Limit your response to eight pages.

Submit information via the PRISM attachment process. Application checklists and attachment forms may be downloaded off the SRFB Web site at http://www.rco.wa.gov/srfb/docs.htm.

NOTE: Acquisition, Combination, Fish Passage, and Diversions and Screening projects have supplemental questions embedded within this worksheet. Please answer the questions below and all pertinent supplemental questions.

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1) PROJECT OVERVIEW

Explain your project overall and include the following elements:

a) List your primary project objectives, such as how this project will improve or maintain habitat conditions and habitat forming processes.

This will be the first year of a three year program. Our primary objectives are to assess the distribution of Japanese Knotweed in the Dewatto and Union River Watersheds, determine riparian conifer replanting needs upon completion of the control process, educate landowners on their responsibility to control invasive species, obtain their willingness to assist in Knotweed eradication, obtain permission for riparian corridor planting of conifers from educated and willing land owners, and apply best practice knotweed control measures resulting in bank stabilization.

Secondary objectives are education of the general public regarding the perils of invasive species such as knotweed and plant recognition.

b) State the nature, source, and extent of the problem that the project will address, including the primary causes of the problem, not just the symptoms. Explain how achieving the project objectives will help solve the problem. (Fish Passage projects and Diversions and Screening projects should refer to the supplemental questions later in this worksheet for further guidance on information to include in their problem statement.)

A noxious weed is a plant that is a declared weed under the Federal Noxious Weed Act of 1974 (USFWS 1974). In order to meet the criteria to be a noxious weed, a plant must either be a human health hazard, or harmful to native plants. Many noxious plant species began their residence in North America due to their aesthetic value to horticulturists. Noxious plants and the eradication of noxious plants via herbicide application can be harmful to fish and wildlife (Davis and Hardcastle, 1959, Mitchel et al., 1987). The 4 noxious species of knotweed have detrimental effect on salmon (Onchorhyncus spp.) however there are methods of control in the Pacific Northwest.

Native plants have evolved over millions of years to fulfill a niche in their resident environments (Kulesza 1975). They have natural predators and disease and compete with other species for water and nutrients in the soil. Noxious weeds have often been imported without their natural predators and diseases and out-compete native plants for water and nutrients (Reichard and White, 2001). Native plants are eliminated and the noxious weeds create a monoculture1.

There are 4 species of knotweed that are of growing concern to salmon ecologists. In the Pacific Northwest riparian areas, giant knotweed (Polygomiun sachalinense), Japanese knotweed (P. cuspidatum), Himalayan knotweed (P. polystachium) and Bohemian knotweed (P. bohemicum) have all become a problem (Udo 2007). These members of the Polygonaceae family are native to Asia but were introduced to North America in the late 19th century (Patterson 1976). Any part of a knotweed plant weighing greater than 5g is capable of producing a new plant via vegetative reproduction (McHugh 2006, Soll 2004).

As early successional species, knotweeds typically emerge in areas of a recent disturbance such as landslides, or falling trees. Early successional species are able to grow in poor soil conditions and help to rebuild the soil by producing large quantities of litter and often contribute beneficial nutrients to the soil. (Parrish and Bazzaz 1982). The plants will remain for about 50 years when they are replaced by larger and longer lived plants and trees that can grow in the newly created soil (Bazzaz 1979). In the Hood Canal Area (HCA), native early successional species include horsetail (Equisetum spp.), red alder (Alnus rubra), willow (Salix spp.) and bitter cherry (prunus emarginata).

Knotweeds are dioecious plants. In their native areas, reproduction includes vegetative and sexual reproduction via insects and wind dispersal. In the HCA, all of the Japanese and Himalayan plants are male and intraspecies reproduction is successful by vegetative means only. Unlike Japanese and Himalayan knotweed, giant knotweed has female plants and can reproduce its own species by sexual means in the HCA. Female giant knotweed plants and male Japanese knotweed plants have hybridized to create the Bohemian knotweed variety (Soll 2004).

Knotweed is extremely aggressive in that it has been observed growing through two-inch asphalt and through the floorboards in newly developed houses. Knotweed contains oxalic acid and may be allelopathic toward other plant species. The costs of the knotweed invasion in the United Kingdom are estimated to be tens of millions of dollars per year. As stated in Udo's (2007) Statewide Knotweed Control Program Progress Report for 2006, $156 million has been awarded for salmon habitat restoration through the Salmon Recovery Funding Board. The knotweed invasion could greatly impact the restoration projects that have occurred in riparian areas. While the economic impacts are great, the ecological impacts are greater and not yet fully quantified. Salmon ecologists are concerned about knotweed because of its bank stabilization characteristics, water use and competition with native plants.

[1] Monocultures are areas that are vegetated by a single plant species and are ecologically damaging because they decrease the biodiversity of plants and wildlife (Franklin et al 1999, Manchester and Bullock 2000, Munro 1967, Wilcove et al 1998).

On a stream that is not infested with knotweed, there is a mix of annuals and perennials, evergreen and deciduous plants present on the banks. This riparian vegetation complex provides a strong and diverse root system that protects the banks during high flow events, fixes Nitrogen (Elmore and Beschta 1987) and produces multiform soil conditions. Modification of the riparian vegetation complex by knotweed decreases the amount of large woody debris (LWD), decreases the diversity and abundance of detritivorous aquatic insects, and increases erosion (Udo 2007).

A reduction in the amount of LWD in streams and rivers causes a breakdown in natural processes that are key to the survival of salmonid species. LWD provides cover for juvenile salmon and their prey in freshwater and estuarine environments (Quinn p. 240). Juvenile coho salmon (O. kisutch) utilize pools created by LWD during summer months when other stream habitat is dry and side channel habitat created by LWD in the winter months when water velocities in the main channel are too high (Quinn 187). Cedarholm and Peterson (1985) found that there was a positive relationship between the amount of woody debris present in the stream channel and number of salmon carcasses retained. Carcasses are a major contribution of nutrients to HCA terrestrial and aquatic ecosystems (Gende et al 2002, Schindler et al 2003). LWD slows the velocity of water and contributes to the retention of spawning gravel in winter flood events (Bisson et al 1987, Ehrman and Lamberti 1992, and Swanson and Leinkamper 1978). Since knotweed prohibits the recruitment of native riparian plants, the number of semi-mature trees available for recruitment in the event of a disturbance is decreased. Over time, there is a decline in the amount of LWD recruited into the waterways.

Detritivorous aquatic insects have preferences for particular species of woody plant leaves (Gray and Ward 1979). Knotweed provides detritus of a different food quality (McHugh 2006) for these aquatic insects that are important food sources for trout and juvenile salmon.

While erosion is a natural occurrence, an increase in the severity of flood events will change spawning and rearing habitat quality especially if the flood severity is increased over many years (Schuett-Hames et al 1999). Erosion can cause an over-widening of the wetted stream channel, decreasing the water depth and increasing the water temperature, which can be fatal to juvenile and embryos of salmon (Quinn 150-153). An increased rate of erosion can also increase gravel depth causing the stream to move underground during the summer months, and fill in pools that are important rearing habitat for juvenile coho (Schuett-Hames et al 1999). The transport and deposition of fines from erosion reduces the dissolved oxygen levels in the gravel, which can also decrease embryo survival in the egg pocket. Erosion increases water velocity and scouring can be deep enough to result in embryo mortality (Quinn 150-153, Schuett-Hames et al 1999). Knotweed increases the severity and frequency of flood events because their weak roots provide poor bank stabilization (Udo 2007). Dispersal and colonization of knotweed is facilitated by erosion of substrate where the noxious weed is present. Increased erosion and distribution of this early successional plant can be considered a feedback effect.

The eradication of knotweed is troublesome. Methods of removal include manual and herbicidal control. Pesticides have historically been known to have detrimental effects on ecosystem health (Gende et al 2002, Pimental and Edwards 1982, and Pratt et al 1997). Many herbicides contain chemicals that are harmful to fish and other aquatic organisms (Chang et al 2005, Davis and Hardcastle 1959, Mullison 1970, and Raloff 2007). The inactive ingredients in herbicides are sometimes more harmful than the active ingredients (Mullison 1970). Inactive ingredients are often not investigated to determine their effects on aquatic animals because the U.S. Environmental Protection Agency only requires that the effects of the active ingredients be studied (Mullsion et al 1970). Knotweed is resistant to many herbicides (McHugh 2006). Products containing glyphosate are effective on knotweed and existing studies of their effect on fish are limited (Folmar et al 1979, Hildebrand 1982, and Mitchel et al 1987). Mitchel et al (1987) studied the effects of Rodeo and Roundup herbicides on rainbow trout (Salamo gairdneri), chinook salmon (O. Tshawytscha) and coho salmon (O. kisutch) and found that these herbicides "would be considered to be slightly toxic and practically non-toxic, respectively to trout and salmon species." This study may be of limited value considering the fact that the manufacturer of Roundup and Rodeo products funded it. Glyphosate is a chemical that affects a plant's ability to produce the amino acids that it requires for growth regulation. Many assume that since animals do not produce amino acids, Glyphosate will not harm them. In Washington State, the use of chemical herbicides in riparian areas requires an Aquatic Applicators License, issued by the Washington State Department of Agriculture in order to avoid the improper use of pesticides resulting in water pollution.

Mechanical control methods include hand cutting, mowing, digging, pulling, tilling and covering (McHugh 2006, Soll 2004 and Udo 2006). These non-herbicidal methods of control are not effective except on a small scale due to the intensive labor involved (McHugh 2006) and the vegetative growth habits of knotweed. When knotweed is cut back or pulled, the rhizomes send up a new shoot at each node causing the stand to thicken (McHugh 2006, Soll 2004 and Udo 2006).

Non-native, invasive knotweed species have begun to receive attention from ecological organizations due to their impact on native plants and animals (McHugh 2006). It is clear that while effective control methods have questionable affects on aquatic animals, the affects of the presence of knotweed on aquatic animals is more detrimental.

c) *Describe the fish resources (species and life history stages present, unique populations), the habitat conditions, and other current and historic factors important to understanding this project. Be specific--avoid general statements. Which salmonid species and life cycle stage(s) are targeted to benefit by this project?*

Salmonid fish resources in the Tahuya River & Mission Creek watersheds include: Bull Trout, Sea-run Cutthroat, and Coho as well as ESA listed Chum & Steelhead.

Most limiting factors have been addressed on the two streams with the exception of the riparian corridor. Within the corridor, Knotweed has become a severe problem in some areas of the two watersheds.

d) Discuss how this project fits within your regional recovery plan or local lead entity strategy (i.e., does the project address a priority action, occur in a priority area, or target priority fish species?).

The current Three-Year Watershed Implementation Priorities for Hood Canal Coordinating Council, lists the Riparian Enhancement and Noxious Weed Control program as a Domain 1 & 2 priority program2.

The assessment or survey portion of the project fills the data gap of where invasive species (Knotweed) exists in the Tahuya River and Mission Creek complexes. Information derived from the survey will aid decision makers is prioritizing investigation in other contiguous watersheds.

Both the watersheds have both Priority One (1) and Priority Two (2) stream reaches in each and both rivers are known to produce ESA listed Steelhead and Chum.

e) Has any part of this project been previously reviewed and/or funded by the Salmon Recovery Funding Board? If yes, please provide the project name and SRFB project number (or year of application if a project number is not available). If the project was later withdrawn for funding consideration or was not awarded SRFB funding, please describe how the current proposal differs from the original.

Not in this watershed complex. PRISM # 08-1994 addressed Knotweed issues in the Union & Dewatto watersheds and has been very successful to date.

When possible, list your sources of information by citing specific studies, reports, and other documents. – ***See Bibliography Attachment in PRISM***

2) PROJECT DESIGN

a) Describe the location of the project in the watershed, including the name of the water body(ies), upper and lower extent of the project (if only a portion of the watershed is targeted), and whether the project occurs in the nearshore, estuary, main stem, tributary, off channel, or other location.

Best available science demands that the project survey must cover from the headwaters of each stream reach that makes up the project river watershed to the mouth of the river (See supplied maps of the project Watersheds).

b) Describe the project design and how it will be implemented. Describe the extent of the project. Describe specific restoration methods and design elements you plan to employ. If restoration will occur in phases, explain individual sequencing steps, and which of these steps is included in this application. (Acquisition-only projects need not respond to this question.)

All prior steps to develop the design and methodology for Knotweed control in the Hood Canal Area have been developed by the HCSEG with existing assets and have been unfunded. The selection of the most infested and best known streams in the

[2] Domain 1 represents natal freshwater and sub-estuarine habitats for 7 extant summer chum subpopulations, 2 extant chinook populations, and 1 extant bull trout subpopulation in the HCCC LE area;
Domain 2 represents natal freshwater and sub-estuarine habitats for 3 re-introduced extinct summer chum subpopulations and all significant nearshore habitats in the HCCC LE area.

immediate local decided the use of our developed planning factors reflected in this proposal.

The project will occur in phases.

- Phase I is the survey of the selected project stream to gather infestation location, type and density information.
- Phase II is the herbicide application (control) phase.
- Phase III is the analysis of cost; methods and effectiveness.
- Phase IV is the monitoring phase and the start of the second of three years control / monitoring that cycles again beginning with Phase I (year 2) followed by Phase I (year 3).
- Phase V begins at the end of the third year Phase IV and consists of Conifer planting in the 80 foot wide Knotweed free riparian zone.
    - The area to be covered is a swath 80 feet wide (40 feet on each bank) of the project stream from the beginning of each stream reach to the mouth of the project stream / river.

Project deliverables will include:

a. Detailed maps of the project stream / river.
b. Detailed field notes on a day by day basis
    i. Location, Type, estimated age of each infested area
    ii. Area covered per day per team member
    iii. Lessons Learned
c. Maps updated with the above data
d. Data input to HWS or other suitable and directed database.
e. Final report detailing activities, costs, effectiveness and lessons learned.

c) Describe the scale and size of the project or property(s) to be acquired, and its proximity to protected, functioning, or restored habitats. (Fish Passage only projects and Diversions and Screening only projects [i.e., not a combination] need not respond to this question.)

Not Applicable

d) Describe the long-term stewardship and maintenance obligations for the project or acquired land. For acquisition and combination projects, identify any planned use of the property, including upland areas.

Not Applicable

3) PROJECT DEVELOPMENT

a) List the individuals and methods used to identify the project and its location.

Mason County Noxious Weed Control Board – HCSEG has been working with MCNWCB surveying the Union River for knotweed. Additionally, MCNWCB has sent out a mailing to landowners on the Union River with the mission of education and feedback. The mailing has a return envelope and questionnaire. MCNWCB's coordinator, Pat Grover, has shared the information from their mailing with HCSEG.

Mission Creek Women's Correction Center – MCWCC is setting up teams of offenders to volunteer in a work program eradicating knotweed with HCSEG in the summer of 2010. Offenders will receive training and the opportunity to become licensed pesticide applicators following the six month program (June-November).

Mason Conservation District: MCD will be helping HCSEG develop a restoration plan for each site and provide cost-share funds to purchase plants and implement planting plans.

Clallam County Noxious Weed Control Board Over the past decade, efforts have been made by Cathy Lucero of CCNWCB to compile the Control Recommendations for Invasive Knotweeds. Cathy has also put a lot of effort into forming the Olympic Knotweed Working Group (OKWG) which is comprised of several organizations working together to form the best strategies of knotweed control. Some of the organizations within the OKWG include CCNWCB, the Lower Elwha Clallam, the Quinault, the Makah, and the Quileute Tribes, Olympic National Park, the Mason County NWCB, Clallam, Jefferson and Mason Conservation Districts and the Hood Canal Salmon Enhancement Group. The Hood Canal Salmon Enhancement Group's proposed project's methods are based upon the experience and lessons learned by the Olympic Knotweed Working Group.

Hood Canal Coordinating Council - The HCCC has put a great deal of work into developing a Hood Canal Knotweed Control Strategy. The control strategy is in draft form and HCSEG is working closely with all the partners involved in developing it. This project will provide an excellent opportunity to supply valuable lessons learned and best control strategies to the Hood Canal Knotweed Working Group.

b) Explain how the project's cost estimates were determined.

Cost estimates were developed by surveying and performing control measures on test stream riparian zones. Time, team size and make-up, area covered, geo position capture, chemicals and supplies used, and field note capture and analysis were analyzed to develop cost planning factors. HCSEG planning factors were compared to Knotweed control project cost in WRIA 17 conducted by another organization, and Knotweed control project cost funded by the SRFB for the Lower Skokomish Valley project. Analysis showed our cost factors within reason and compared favorably with the two other cost models analyzed.

c) Describe other approaches, opportunities, and design alternatives that were considered to achieve the project's objectives.

There is only one way to effectively control Japanese Knotweed in the Hood Canal area. The plants can be chemically sprayed early in the year with maximum application rates of 400 acres per stream year. Direct plant injection with approved herbicides, and / or the very labor intensive method of grubbing and properly disposing of the material. **Regardless of the methods employed the same**

general regime must be applied each year for three (3) years in order to assure control measures are effective.

d) Describe the consequences of not conducting this project at this time. Consider the current level and imminence of risk to habitat in your discussion.

Knotweed infestations will continue to spread causing damage to the riparian corridor, harm to particularly juvenile salmonids, and finally will be all the more costly to control when the damage becomes more severe as it will do if unchecked.

e) Describe any concerns about the project raised from the community, recreational user groups, or adjacent land owners, and how you addressed them.

Last year's project # 08-1994 proved that after one (1) year of locating, mapping and controlling Knotweed all landowner concerns have been addressed through education and direct contact. We intend to follow the same proven strategy in these watersheds.

f) Include a Partner Contribution Form, when required, from each partner outlining its role and contribution to the project. This form may be downloaded off the SRFB Web site. State agencies are required to have a local partner that is independently eligible to be a project sponsor. A Partner Contribution Form is also required from partners providing third-party match.

Available in PRISM

g) List all landowner names. Include a signed Landowner Acknowledgement Form (available on the SRFB Web site) from each landowner acknowledging their property is proposed for SRFB funding consideration. If a restoration project covers a large area and encompasses numerous properties, Landowner Acknowledgement Forms are not required. For sponsors proposing work on their own property, this form is not required. For multi-site acquisition projects involving a relatively large group of landowners, include, at a minimum, signed Landowner Acknowledgement Forms for all known priority parcels.

If a restoration project covers a large area and encompasses numerous properties, Landowner Acknowledgement Forms are not required. Therefore, Not Required.

h) Describe your experience managing this type of project. List the names, qualifications, roles, and responsibilities for all known staff, consultants, and subcontractors who will be implementing the project. If unknown, describe the selection process.

The HCSEG was founded in 1990. During the subsequent nineteen (19) years the HCSEG has completed 121 separate ecosystem preservation, acquisition, and remediation projects at a total cost of approximately $18,500,000.00. All projects have been completed in accordance with design criteria and the overarching project plan(s). This record of achievement and success indicates a near perfect probability of success on this project as well. Specific examples of our work can be accessed on our web site: www.hcseg.org.

Key project supporters include:

1) **Neil W. Werner** – **Project Manager**; Executive Director Hood Canal Salmon Enhancement Group.
2) **Kim Gower - Office Manager** responsible for general administrative business operations.
3) **Mona Pillers - Office Accountant** and Administrative Assistant responsible for the day to day functions of financial accounting; researches information for projects, grants and legislative policies.
4) **Mendy Harlow** - HCSEG Invasive Weed Project Lead; provided in depth literature review, emerging best practices and an intimate knowledge of the two (2) project river topographies.

4) TASKS AND SCHEDULE

a) List and describe the major tasks and time schedule you will use to complete the project.

The Hood Canal Salmon Enhancement Group is working on the eradication of knotweed in the Dewatto and Union Rivers. This is an involved process that will engage staff and volunteers with public landowners that live in the Dewatto and Union River watersheds.

- November-December 2009 – Survey Union River for Presence of knotweed. Size of patches and distance from Union River or tributaries will be noted along with GPS locations.
- December-February 2010 – Survey Dewatto River Watershed for presence of knotweed. Size of patches and distance from Dewatto River and tributaries will be noted along with GPS locations.
- January 2010 – Obtain contract form USFWS with a notice to proceed.
- February 2010 – Input survey data into ArcView 9.0 to develop infestation maps. Overlay infestation maps with the Mason and Kitsap County parcel information to find landowners.
- March 2010 – Make initial contact with new landowners and follow-up with previously contacted landowners that have knotweed on their property. Educate them on the problems with knotweed including bank stabilization issues and ecological issues.
- March-May 2010 – Obtain landowner agreements/permission to treat knotweed on private property.
- June-October 2010 – Knotweed control with herbicide.
- November 2010 – Develop annual report; publish by November 30th, 2010.
- December 2010– Submit applications for 3nd year of funding.

CONSTRAINTS AND UNCERTAINTIES

b) Each project should include an adaptive management approach that provides for contingency planning. State any constraints, uncertainties, possible problems, delays, or unanticipated expenses that may hinder completion of the project. Explain how you will address these issues as they arise and their likely impact on the project.

Access to the stream bed and bank are not assured. Most landowners will welcome the survey and controls team when educated that they are responsible for invasive species. **Cost** will be assured as the team is made up of interns and volunteers

supervised by three (3) qualified members with an ***Aquatic Applicators License***, already on staff. **Quality** will be assured by adherence to the approved project methodology and plan supported by direct project management oversight. **Schedule** is an uncertainty as weather impacts on the ground activity. However, normal spring, summer and fall exists for an extended period generally offering ample opportunity for mild weather during the survey, control and planting season.

Supplemental Questions

5) ***PROJECTS INVOLVING ACQUISITIONS (Applies to both Acquisition-only and Combination Projects)– Answer the following questions***

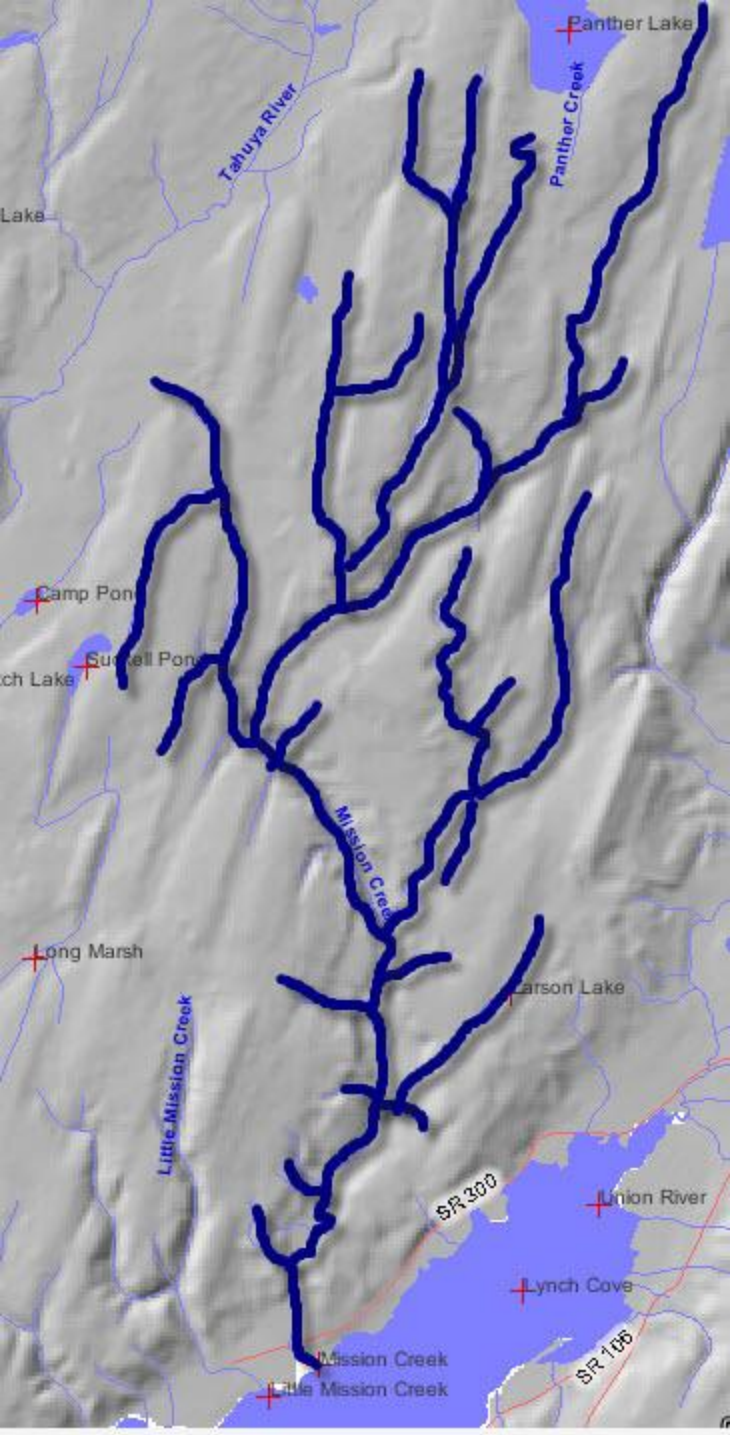
Not Applicable

6) ***FISH PASSAGE PROJECTS -- Answer the following questions:***

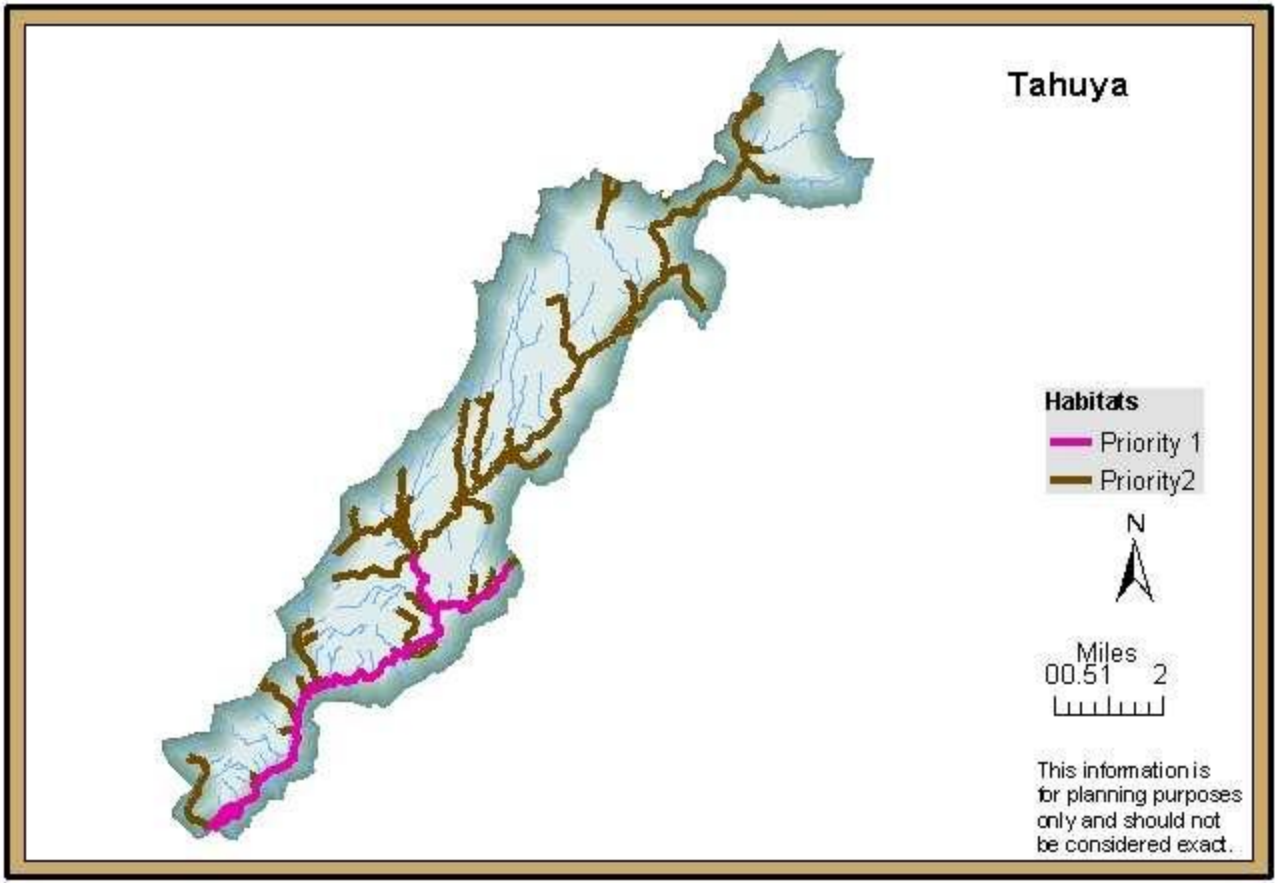
Not Applicable

7) ***DIVERSIONS AND SCREENING PROJECTS -- Answer the following questions:***

Not Applicable



Hood Canal SEG; Knotweed Control - Mission & Tahuya Year 1 - 137 (#09-1641)



Hood Canal SEG; Knotweed Control - Mission & Tahuya Year 1 - 137 (#09-1641)
Attachment #10, Tahuya Habitat 1-2 Map

Hood Canal SEG; Knotweed Control - Mission & Tahuya Year 1 - 137 (#09-1641)

Hood Canal SEG; Knotweed Control - Mission & Tahuya Year 1 - 137 (#09-1641)
Attachment #2, Knotweed Shoots

Hood Canal SEG; Knotweed Control - Mission & Tahuya Year 1 - 137 (#09-1641)

Hood Canal SEG; Knotweed Control - Mission & Tahuya
Year 1 - 137 (#09-1641)

Hood Canal SEG; Knotweed Control - Mission & Tahuya Year

Hood Canal SEG; Knotweed Control - Mission & Tahuya Year 1 - 137 (#09-1641)
Attachment #6, Typical Creekside Infestation

Hood Canal SEG; Knotweed Control - Mission & Tahuya
Year 1 - 137 (#09-1641)

Hood Canal SEG; Knotweed Control - Mission & Tahuya